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# (54) Casing extender

(57) In offshore oil well drilling the drill hole is lined with steel casings. These are of reducing diameter with depth and are hung one within another. As each casing hangs a preset amount below the one above before being properly seated there is a void between the lowermost casing and the bottom of the drill hole. This void collects loose debris from the drill hole wall to the detriment of the drilling action.

The present invention provides an extender 6 for the casing which is slidable on the lowest casing member 2 so as to extend to a varying degree from the lowest casing. Sealing members are provided to seal the extender against the casing. The extender is fixed in a non extended position before use by shear pins 7. These pins can be severed by the application of a downward force to the extender.

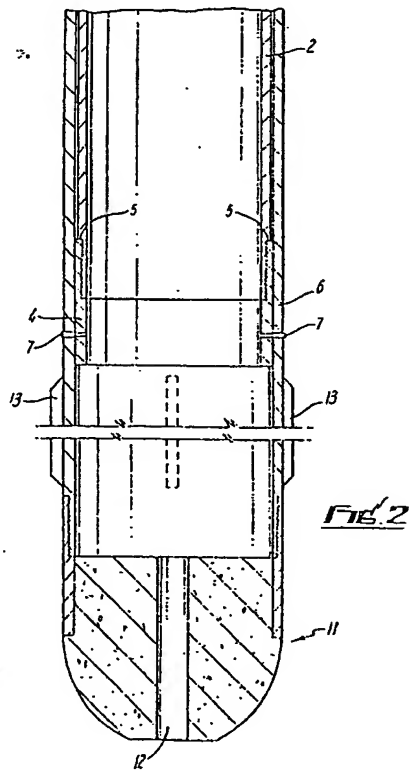


Fig.2





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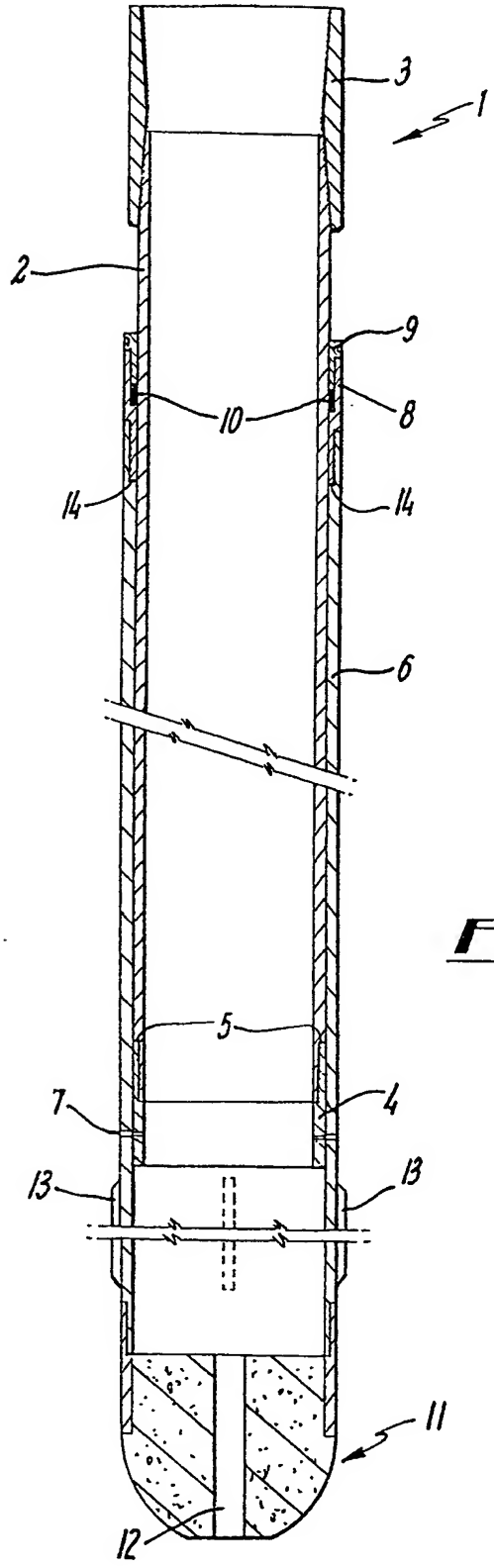


FIG. 1

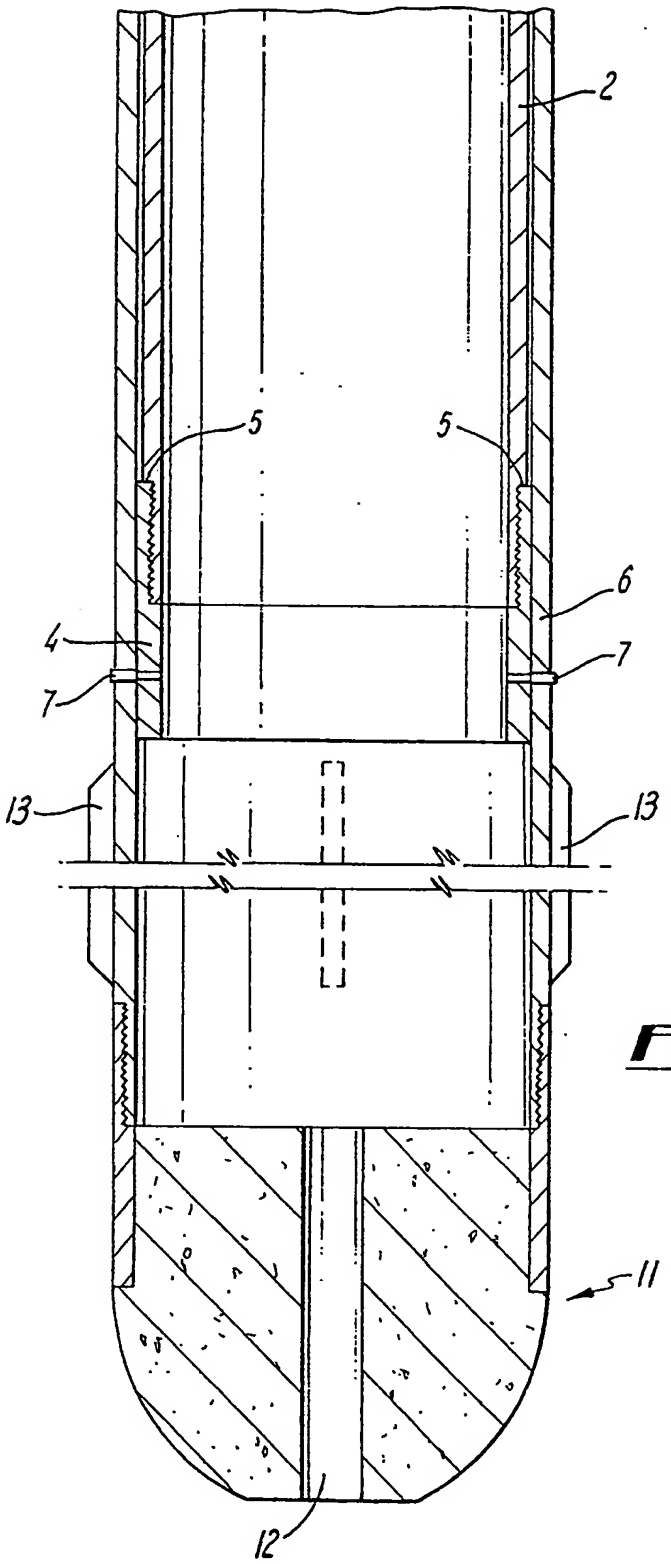


FIG. 2

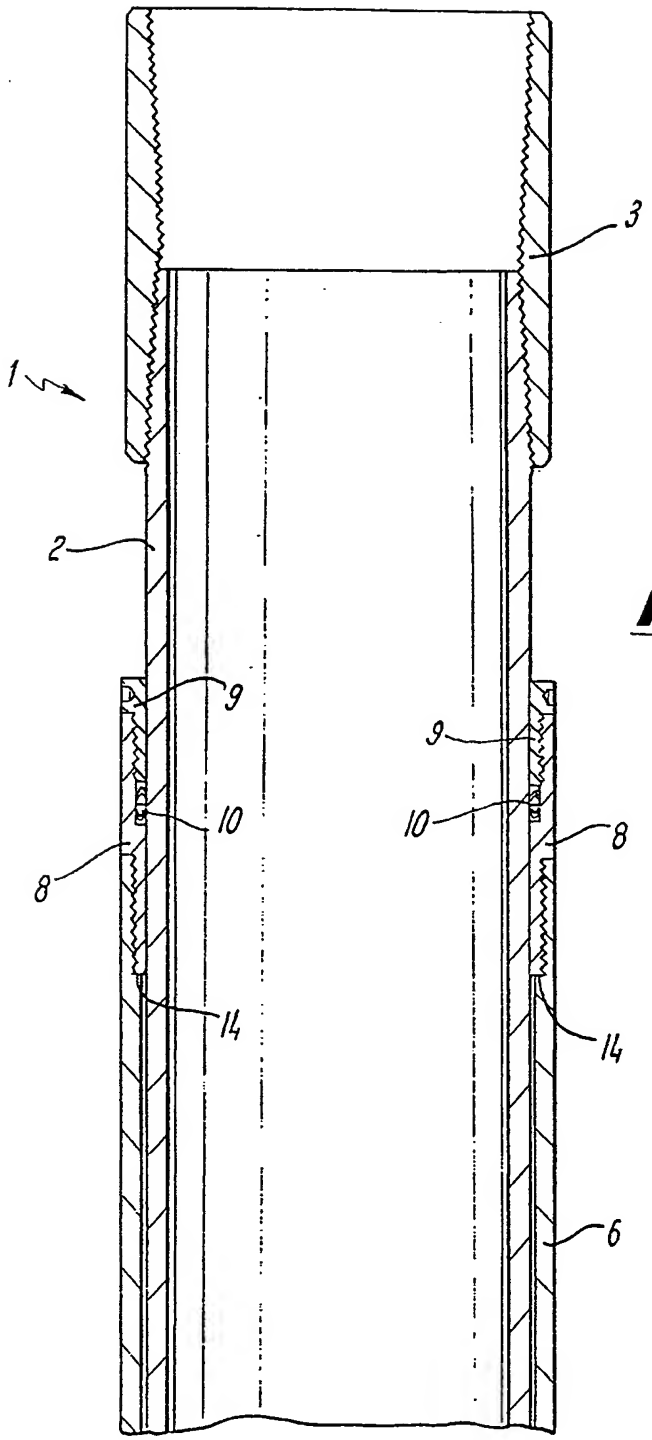


FIG.3

SPECIFICATION

## Casing extender

This invention relates to a casing extender.

When drilling oil wells, especially in offshore environments, the drill hole is lined with steel casings which are of reducing diameter with increasing drill hole depth. Cement is pumped between the casings and the drill hole wall to secure the casings and prevent leakage of fluid.

The casings are each hung one within another, sequentially narrower casings being applied when the drill hole has been formed sufficiently deep to allow the casing to be hung from its seating on the existing casings.

As the suspension points for the casings are preset, each successive casing terminates above the bottom of the drill hole so that it can be properly seated, and in general a void of some 35-40 feet in depth remains between the bottom of the lowermost casing and the bottom of the drill hole. This void then tends to collect loose debris from the drill hole wall.

As drilling is continued through the floor of the void area the loose debris can fall into the newly-formed drill hole behind the drill bit, causing the drill bit to jam in the hole and making it difficult for the bit to be removed.

Also, the void is of greater diameter than the casing and the newly-formed drill hole, so that cuttings from the hole lose velocity in the void as they are pumped to the surface in entrainment with drilling mud. As a result they come out of entrainment and collect in the void, increasing the amount of downhole debris.

According to the present invention there is provided a casing extender comprising a tubular member in engagement with a casing member and movable on the casing member, the tubular member being movable on the casing member so as to extend to varying degrees beyond a lower end of the casing member, the interior of the tubular member on such extension being in communication with the interior of the casing member.

The tubular member is preferably in sliding engagement with the casing member, and is preferably concentric with the casing member with sealing or packing means between them to prevent flow of fluid between them.

The tubular member may be held on the casing member in an out-of-use position in which it does not extend beyond the lower end of the casing, or extends only to a limited extent beyond the lower end. The members may for example be held together in that position by means of shear pins or the like which can be severed on application of a downward force to the tubular member. Such force may be applied by means of fluid pumped against a face of the tubular member.

The extent of travel of the tubular member on the casing member may be limited by providing stop means which prevent the tubular member from leaving its engagement with the casing member.

The tubular member may carry projections or other formations on its outer face to prevent its rotation relative to the casing member, the projections being arranged to engage with fixing cement or the like which may be provided around the tubular member.

An embodiment of the present invention will now be described by way of example with reference to the accompanying drawings in which

*Figure 1* is a side sectional view of a portion of casing for use downhole and having a casing extender of this invention, and

*Figures 2* and *3* are enlarged portions of Figure 1.

Referring to the drawings, on which dimensions are given by way of example only, a casing 1 for insertion into a drill hole in the sea bed has a buttress threaded coupling 3 carrying a lowermost casing section 2 of 9.625" outside diameter. The casing section 2 terminates at its lower end in a bumper stop 4 which is screwed to the section 2 and protrudes radially beyond the section 2 to form a shoulder 5.

A tubular extender sleeve 6 of 10.750" outside diameter is mounted around the casing section 2 and radially spaced from it along a portion of its length. The sleeve 6 is apertured to receive shear pins 7 which pass through it into corresponding apertures in the bumper stop 4, thereby holding the sleeve 6 and section 2 together. The sleeve 6 is a sliding fit on the bumper stop 4.

At its upper end the sleeve 6 has screwed to it a packing gland 8 to which is screwed a packing follower 9. The gland 8, follower 9 and casing section 2 outer face define an annular chamber in which a chevron packing member 10 is disposed to prevent fluid flow between the gland 8 and the casing section 2. The gland 8 and follower 9 are a sliding fit on the casing section 2 and the gland 8 forms a shoulder 14 where it protrudes inwardly of the sleeve 6.

At its lower end the sleeve 6 caries through a screw connection a guide shoe 11 which has a through bore 12 of 1.5 diameter. Adjacent the shoe 11 the sleeve 6 has fins 13 extending radially from its outer face and circumferentially spaced around it. Further fins may also be provided on the sleeve 6 adjacent the gland 8 if desired, but they are not present in this embodiment.

In use, with the shear pins 7 in place and the sleeve 6 in the position shown, the casing 1 is inserted into a drill hole and suspended from a standard mounting so that the shoe 11 is disposed about 35 to 40 feet above the bottom of the drill hole. The drill hole inevitably has loose debris accummulated in it below the shoe 11. Drilling mud is then pumped down within the casing 1 and exerts a downward force on an upwardly-directed face 14 of the shoe 11. This causes the pins 7 to shear, releasing the sleeve 6 and causing it to move downwadly over the casing section 2 until the shoe 11 rests on the loose debris in the drill hole, thus effectively extending the length of the casing 1 to the desired depth, and preventing the formation of a void between the shoe 11 and the debris. Overextension of the sleeve 6 is prevented by the eventual engagement of the shoulders 5 and 14 at the limit of travel of the sleeve 6 on the section 2.

Cement can then be pumped down through the

casing 1 and out through the bore 12 to fill the annular space between the outer face of the casing section 2 and the drill hole wall. When the cement sets it does so around the fins 13, thus holding the sleeve 6 against rotation within the drill hole when drilling is recommenced.

When drilling restarts, drilling mud is pumped from the surface to the drill bit to entrain cuttings and carry them to the surface. The extension of the casing by means of the sleeve 6 prevents these cuttings from being lost from the mud flow, as the formation of a void between the casing and the bottom of the existing drill hole is prevented. Further, it is less likely that loose debris will find its way into the newly-formed drill hole to interfere with operation and removal of the bit.

Modifications and improvement may be made without departing from the scope of the invention.

## CLAIMS

1. A casing extender comprising a tubular member in engagement with a casing member and movable on said casing member so as to extend to varying degrees beyond an end of said casing member, the tubular member and the casing member each having an interior, said interiors being in communication on said extension of said tubular member.

2. A casing extender as claimed in Claim 1, wherein the tubular member is slidable relative to the casing member.

3. A casing extender as claimed in Claim 1 or 2, wherein the tubular member is concentric with the casing member.

4. A casing extender as claimed in any one of the preceding claims, wherein sealing means are provided between the casing member and the tubular member to prevent flow of fluid between the casing member and the tubular member.

5. A casing extender as claimed in any one of the preceding Claims, wherein the tubular member is locatable on the casing member in a position of least extension by shear pins extending between the tubular member and the casing member.

6. A casing extender as claimed in any one of the preceding Claims, wherein stop means are provided which limit the extension of said tubular member on said casing member.

7. A casing extender as claimed in any one of the preceding Claims, wherein an outer face of the tubular member has projections which engage with fixing means provided on the tubular member to prevent rotation of the tubular member relative to the casing member.

8. A casing extender substantially as hereinbefore described with reference to the accompanying drawings.

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